

FLEXIBLE SPACES &

INTRODUCTION

Adaptable and flexible modular housing can be broadly defined as housing that can adjust to changing needs and patterns, both social and technological. However, it is key to note that there is a difference between adaptable and flexible housing, that being adaptability is capable of different social uses, whereas flexibility is capable of different physical arrangements.

This type of architecture gives special consideration to social changes through its ability to easily develop to suit the individual users needs.

The ensuing chapter study focuses on the physicality of flexible housing and the different techniques that can be utilised in order to design a flexible housing space.



Mostaedi, A. Great Spaces Flexible Homes, pg 6.

MODULARITY NEXTGEN HOUSING

NEEDS AND USES

Housing is known to be quite volatile. It is subject to a whole range of cyclic and trend changes and over time it becomes at best unsatisfactory, at worst obsolescent. It is a fact that the vast majority of housing actually builds in inflexibility and hence obsolescence.

This idea of built in inflexibility is not a new notion, and some believe it is not entirely accidental. Several developers are of the view that through built in inflexibility a residence becomes obsolete for a particular occupant, leaving them no choice but to move. This obviously keeps the housing market in a state of permanent demand.

On the other hand, if flexibility was designed and built into residences it would give occupants the ability to adapt their houses to their changing needs and thus stay longer in them, thereby depressing the housing market and limiting the continuing sales on which developers are dependent.

Studies in the Netherlands have shown that the vast majority of people are more likely to stay in their homes if they are able to adapt them to their requirements. By contrast, a high percentage of people move homes due to the fact that they are unable to adjust their current dwelling to their needs.

There are various changing needs that require flexibility within housing such as personal (expanding families), practical (the onset of old age), and technological (updating old services). Changing patterns also require flexibility and can include demographics (the rise of the single person household), economics (the rise of the rental market), or the environment (the need to update housing to respond to climate change).

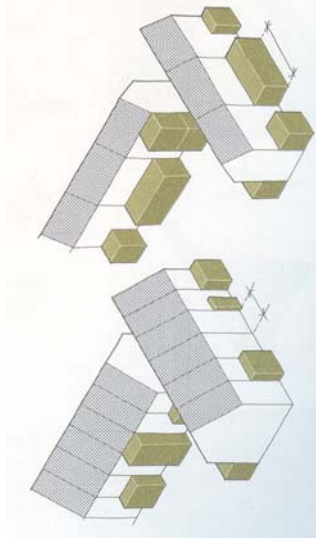
One of the earliest ideas about flexible housing design is to allow occupants to have the freedom and choice to alter and arrange spaces to suit their needs rather than having the architectural design decisions predetermining their lives.

However, many architects are afraid to design with future flexibility in mind as they are concerned that they will lose control over the building and the way it is used in the future. There is also the fear of increased costs, although the higher initial cost of designing and building flexible housing far outweighs the long term costs of upgrades, management, refurbishment, and adaptable alterations to non-flexible housing design and construction.

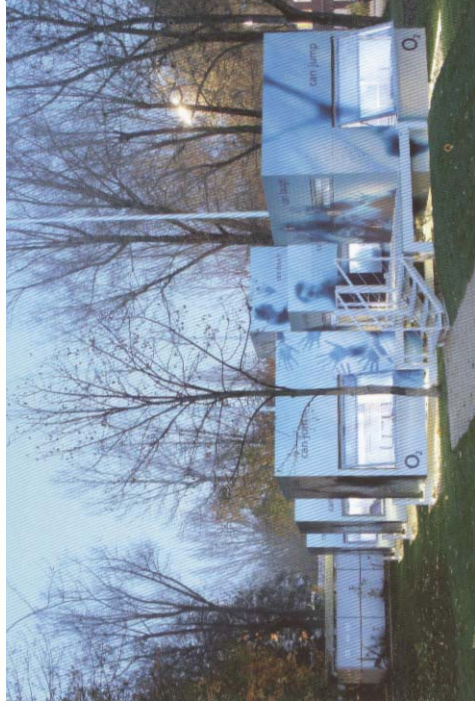
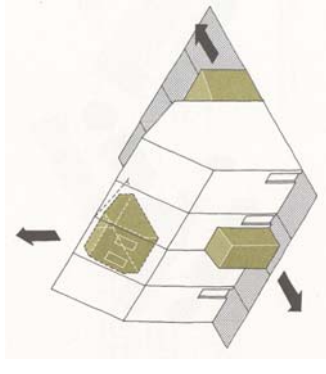
Therefore it is clear to see that flexible housing is an economic and sustainable benefit so we must ask ourselves, why would one not design for flexibility and adaptability?

TYPOLOGIES: ADDING ON

- Adding on is a term that describes the ability of an occupant to expand and change the space within a dwelling by 'plugging-in' an additional unit in order to elaborate and increase volumetric potential.
- This can be done through adding various modules at specific points of the structure in order to increase the available size and/or the usage of various spaces within the dwelling.
- The potential for these types of additions should be tested at the design stage in order to determine that the initial plan layout can anticipate future additions rather than limit them.
- These types of additions need not be limited to the horizontal plane, it is quite possible to add-on vertically within existing roof space or on top of the existing dwelling.
- Ideally it should be possible to access a future addition through existing circulation space.
- Where possible an addition should limit the loss of natural light to existing spaces within the dwelling.
- Lintels and frame openings should be built in where future additions are anticipated.
- The addition of future services to the dwelling must be carefully considered so as to not incur huge disruptions to the existing dwelling.
- In the case of vertical additions the location of the staircase must be considered so that it can be easily constructed and blended into the existing dwelling.
- There should be a provision for roof lights to be installed in order to maximize natural light to vertical additions.
- The ability to easily extend a dwelling both vertically and horizontally is a key aspect of flexible modular housing design that offers many alternatives and opportunities for the inhabitants, while also increasing the marketability of the development.



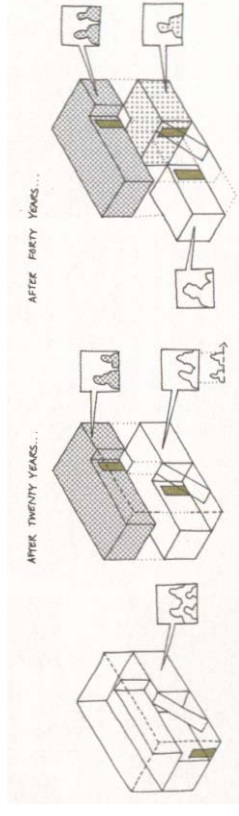
Schneider, T. & Till, J. Flexible Housing, pg 183-184.



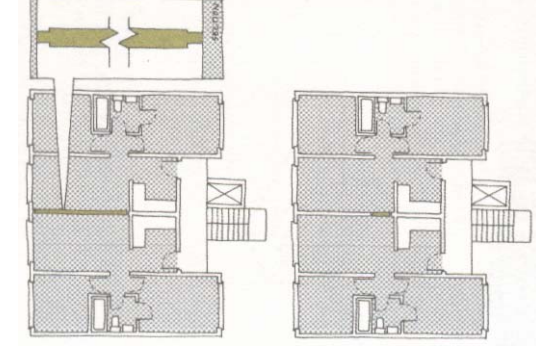
Mostaedi, A. Great Spaces Flexible Homes, pg 179.

JOINING AND DIVIDING

- Joining together is basically the technique of linking two individual adjacent spaces to form a single larger space.
- This approach is a much more economical solution than providing unused excess space to be filled at a later date.
- The design of a dwelling must be considered in addition to its surrounding dwellings, rather than each dwelling being designed in isolation. When dwellings are designed in isolation they are all but locked in to a particular size and layout with no room for future expansion.
- The potential to form larger units addresses the demands of some extended and growing families and is a long term strategy.
- Sharing an entrance hall is one of the most common methods of allowing two units to be joined, so that they may be entered separately or as one.
- When joining units it must be considered at design stage to minimize the doubling up of services such as bathrooms and more importantly kitchens.
- Conversely, dividing up is the separation of one space to form two separate spaces. The space to be divided may have been previously joined; however, it may also have been designed to be separated at a future date to suit a smaller family occupant.
- For some cases of dividing, issues of access need to be defined at the design stage.
- When joining or dividing is being considered all possible future openings should be considered and planned with framing in place for ease of opening up the dwelling in the future. This may be achieved through the provision of soft walls that can be easily removed.
- The potential to join and divide units is a long term strategy that provides greatly increased flexibility and a variety of rental opportunities.



Schneider, T. & Till, J. Flexible Housing, pg 188.



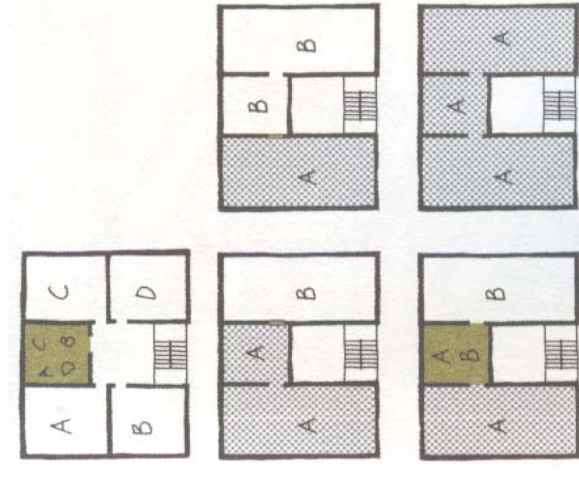
Schneider, T. & Till, J. Flexible Housing, pg 187.



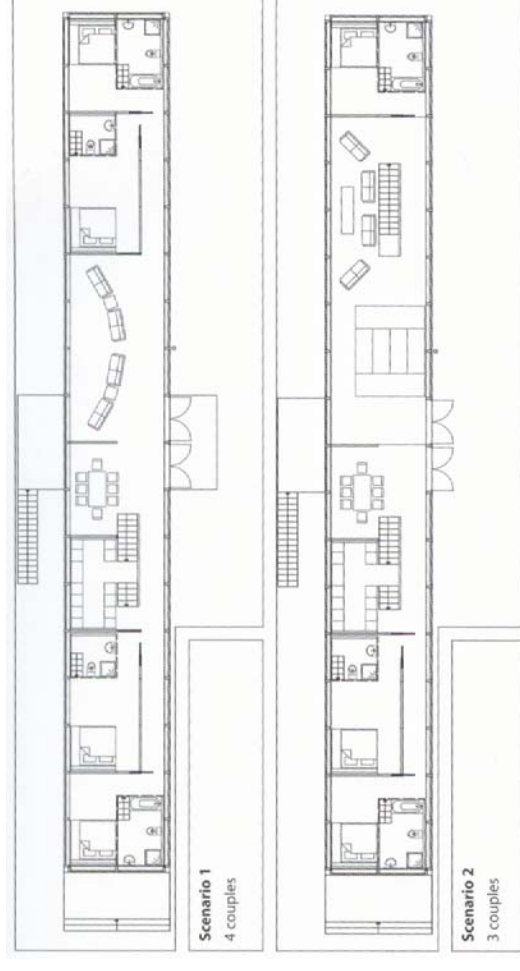
Atelier Hitoshi Abe, Make of righth duplex house

SWITCH ROOMS

- The switch room is the idea of a space that has been designed with consideration to two adjacent dwellings, whereby the owners of the two dwellings can negotiate the use of the adjacent space.
- A switch room is classified as a non-specific room.
- This method is somewhat more simple than that of joining up as it does not depend on adjacent tenancies being available at the same time to be joined up.
- The switch room is a more modest approach and is in some cases designed as a larger space that also accommodates a small bath room and kitchen so that it can be used completely separately or partially joined to another unit and be used as a granny flat, home office, or a studio. In these instances separate access is crucial.
- The use of the switch room is negotiated between the two tenants and the tenant that requires the room at that particular time takes ownership and responsibility of it. When that tenant no longer requires the extra space provided by the switch room they offer it back to the other tenant.
- The only disadvantages with this flexible housing typology is that of conflict between the two tenants if both require the extra space, or conversely if neither requires the extra space it may sit idle and unoccupied.



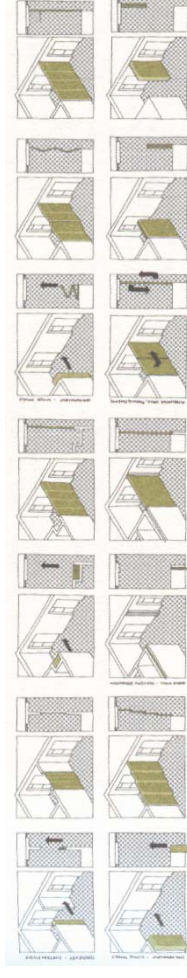
Schneider, T. & Till, J. Flexible Housing, pg 189.



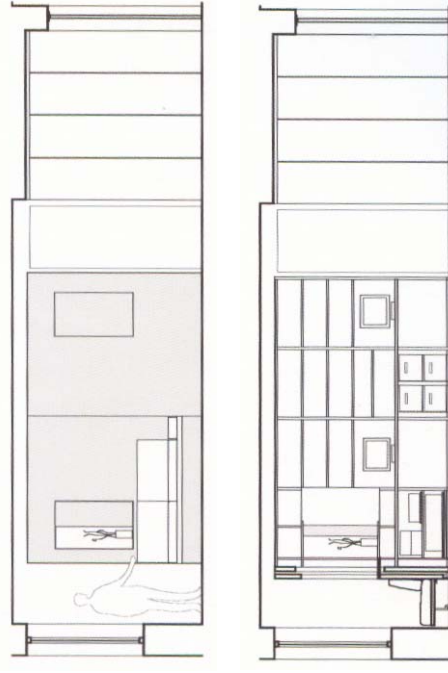
Mostaedi, A. Great Spaces Flexible Homes, pg 92.

MOVABLE AND SLIDING WALLS

- Movable and sliding walls are elements that can be quickly moved and arranged in order to re-configure spatial organization within a space.
- These movable and sliding elements can also provide additional spatial and functional variety.
- Movable and sliding walls are one of the most common design features in architecturally designed flexible modular housing.
- The design of these elements must be well thought out so that within a matter of minutes a space can be completely changed from an open plan to a series of separated spaces or vice versa.
- Panels must be designed to fold away into cupboards or walls and not impede any structural elements or have movement paths being governed by such structural elements.
- The flexibility of this system can be seen as being limited as there is really only two pre-conceived and pre-designed options for spatial configuration within the dwelling, those being with the walls folded away, or extended out to their final position.
- The issue of practicality is also to be considered in the fact that through the moving and sliding of wall panels there must also be a consideration as to the placement and location of furniture within the space, and whether or not this furniture is required to be moved to suit both of the possible spatial configurations.
- It is also possible to add movable walls and panels at a later date in order to provide additional spatial and functional variety.
- Movable and sliding walls have the possibility of being designed to allow different layouts to be both permanent and semi-permanent.



Schneider, T. & Till, J. Flexible Housing, pg 191.



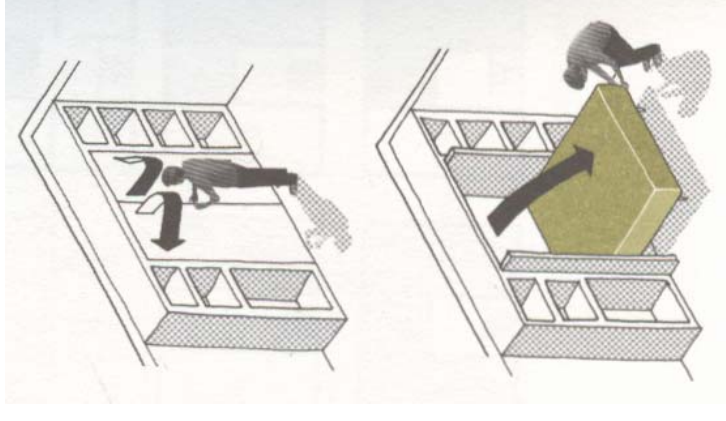
Mostaedi, A. Great Spaces Flexible Homes, pg 74.

FOLDABLE FURNITURE

- Foldable furniture is the idea of built in furniture that can fold out or down in such a way that when the items are not required the space can have a secondary use.
- This method allows the inhabitant to change the use of a room on a daily basis with very minimal effort and time.
- The fold away bed is the most common type of foldable furniture as it allows a room to be used in one way during the day but also as a bedroom during the night.
- For foldable furniture to be successful its design must be integrated into the fabric of the dwelling so that it does not appear as an after thought, therefore it is essential that the layout of the room works both when the furniture is folded up and not in use and folded down and in use.
- This technique is particularly useful in dwellings that have very tight spaces.
- Other types of foldable furniture may include sliding doors to cover up kitchen units, fold out tables and ironing boards, and bunk beds over storage units.
- The most successful installations of foldable furniture are those that are designed in such a way that the fixed and foldable elements do not change, however through their design they are able to adapt to various changing situations.
- There also lies the possibility in the use of fixed furniture that has various uses and is open for interpretation.
- Fixed multiple use furniture can include a desk that runs along an entire wall that is designed to be low and strong to double as a children's play area, a workspace, a drawing area, and a place for various electrical and everyday items.
- These rooms can also have their uses changed and adapted through and entirely different use of the same fixed elements.



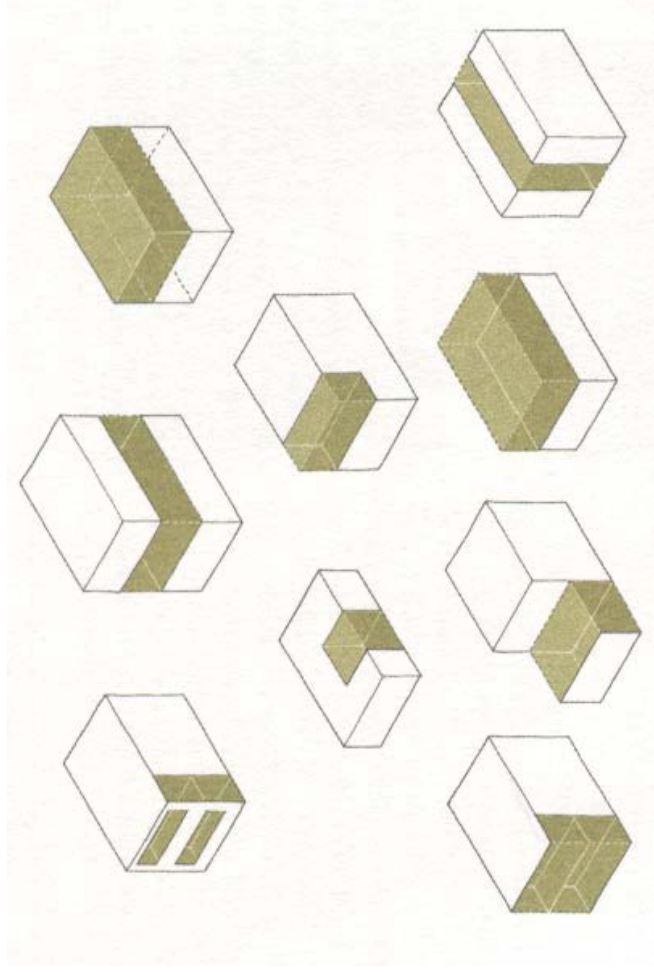
Mostaedi, A. Great Spaces Flexible Homes, pg 24.



Schneider, T. & Till, J. Flexible Housing, pg 190.

SLACK SPACE

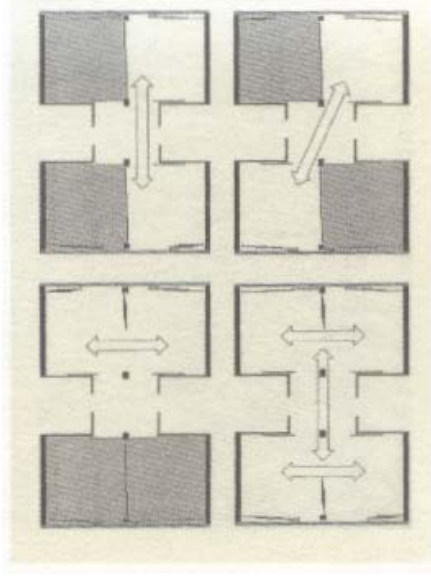
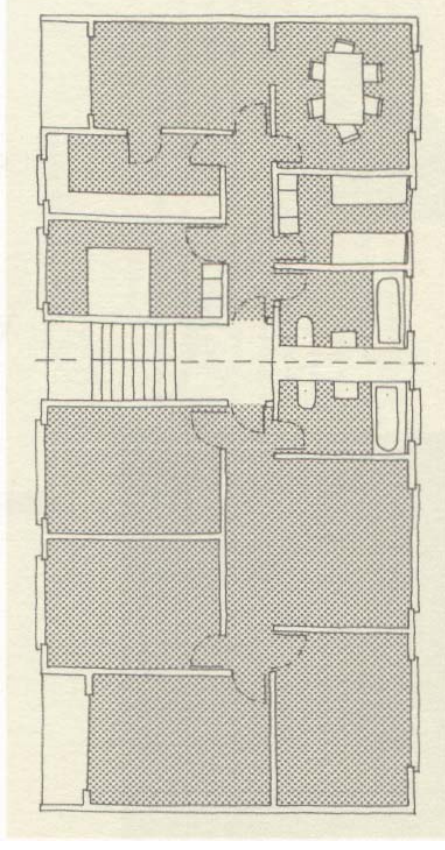
- Slack space is space that has been provided by the designer where the occupation or use has not been fully determined and is up to the particular needs of the occupant.
- Slack space is allocated space where something will happen at a later date, but what exactly that something might be is not programmed and annotated.
- Slack space is not just any empty space around a building, it is a space that is suggestive of potential occupation, and providing a greater flexibility in use.
- These spaces are areas that are anticipatory of potential occupation and future needs and uses.
- Slack space can be found both internally, in alcoves that can be enclosed or have furniture built in or balconies that can be glazed and turned into additional rooms, and externally, on flat roofs that can be built on or courtyards that can be filled in or communal stair wells with large landings that can be occupied.
- In all these cases the designer deliberately provides spaces for appropriation but does not determine their exact use or spatial configuration.
- Slack spaces are sometimes described as and thought of as 'unfinished spaces', provisional frameworks that must still be filled in to be completed.
- For slack space to work successfully the designer must think of the various ways in which the allocated space may be appropriated and then design the space accordingly.



Schneider, T. & Till, J. Flexible Housing, pg 185.

FUNCTIONALLY NEUTRAL ROOMS

- The best way of achieving flexibility is to get rid of room designations as these labels inhibit flexibility both in the initial design and the subsequent use of a dwelling.
- Labeled rooms inhibit flexibility, thus by providing unlabelled rooms it is solely up to the occupants of what they see to be the most beneficial use of each space.
- By labeling rooms it is common practice that they will be designed in such a way to fulfill the purposes of that label.
- Through the designing of unlabeled spaces there lies a creation of functionally neutral rooms that may be adapted and changed to suit the requirements of each individual occupant.
- The main strategy of functionally neutral rooms is to provide a number of equally sized rooms off a central hall or circulation space with the services possibly being allocated to the smaller areas.
- By removing the hierarchical order contained in the labeling of rooms each space becomes an independent entity which can be used according to the needs of the occupants, which will also inevitably change over time.
- An added benefit of the use of functionally neutral rooms is that the same housing unit can be occupied by a variety of different user groups.
- The minimum sizes of a functionally neutral room can be derived from various furniture layouts in order to accommodate a range of furniture layouts from living rooms to bedrooms to dining rooms with the most common sizes being a larger 3.6m by 4.0m and a smaller size of 3.2m by 3.8m.



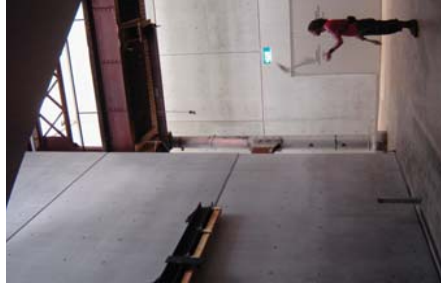
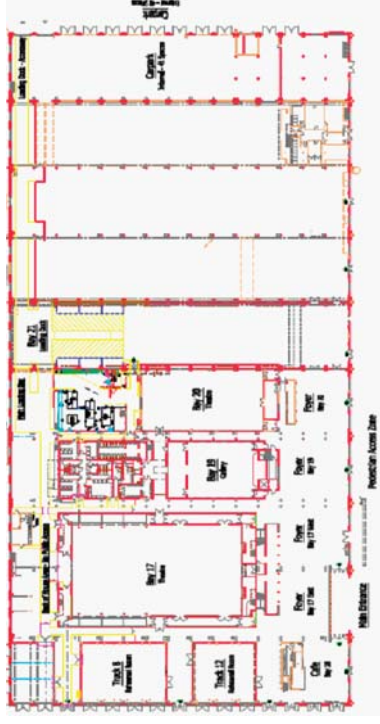
Schneider, T. & Till, J. Flexible Housing, pg 186.

CARRIAGEWORKS

CarriageWorks is a multi-venue centre focused on the creation and presentation of contemporary art and culture. CarriageWorks is housed in the old Eveleigh Rail Yards, located within the emerging Redfern Waterloo precinct, and has been developed by the NSW State Government through Arts NSW. It has been transformed into an innovative new centre committed to the conception, development and presentation of a wide spectrum of performance. Tonkin Zulaikha Greer's adaptive reuse of the building as the CarriageWorks Contemporary Arts Centre has embraced the building's past whilst providing it with a bold new future.

Three fully serviced, flexible theatre spaces – small, medium and large – rehearsal rooms, administrative offices, workshop space and amenities are housed in discrete concrete boxes. These are clearly articulated from the heritage fabric, which retains its patina of age and use and its remaining industrial artefacts. The new forms stand free of the rows of original cast iron columns, creating circulation routes in the interstitial spaces with views through the building. The foyer spans the entire width of the building. The front of house is divided by glass doors from the back of house activities, which are located adjacent to the railway tracks.

The flexible theatre spaces had been reached by applying systems such as open space, prefabricated concrete, perforated metal panels which allow movement and flexibility of functionality.



Photographer: Nathalie Santamaria



RELEVANCE TO NEXTGEN BRIEF

LOW COST

Australia currently has the least affordable housing of anywhere in the world. According to Ron Sanchez on Modular Architecture, through modularity you can achieve very high levels of product variety, while at the same time achieving low costs for developments as well as cost savings in production. With strategies such as prefabrication, the cost of dwellings could be reduced even further.

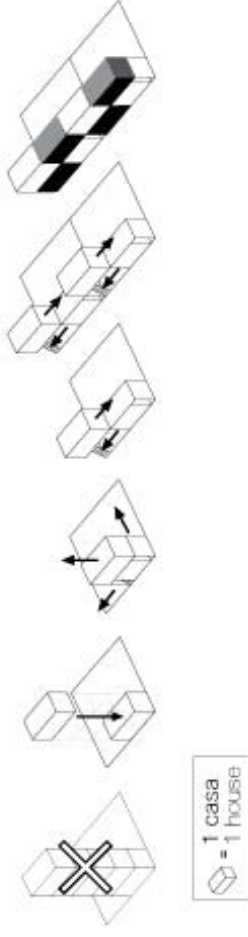
It is necessary to reuse spaces and design minimal and efficient spaces in convenient locations for the user.

The modular approach raises the decision-making process in product development to a more strategic level, which means a higher level of abstraction. Rather than committing the design process to creating a single product design, management must now decide about developing a "platform" for a broad approach to the market, and often including plans for future upgrading of products when new component technologies become available.

With modular architecture users can become the drivers of the product variety of a dwelling. In effect, the advent of modularity allows the locus of product definition to shift from producers to consumers.

DENSITY

Since the 1970's a wave of development in Australian cities began to increase density and therefore drove house price upwards. Housing demand outstrips supply as Australia's population continues to grow. With today's population predicted to almost double by 2050 the rapidly increasing demand for housing will continue. As population grows, architecture needs to be responsive and adaptable to this growth by altering, converting or extending.



Aravena, A. Quinta Monroy

DIFFERENT USES

Modularity makes possible strategies in which producers define architectures that will accept a range of component variations that provide different functions, features, and performance levels-and then offer a menu of choices to consumers.

RELEVANCE TO NEXTGEN BRIEF

SOCIAL USE

This architecture has a capacity to adapt to different socio-cultural situations.

Alejandro Aravena states, “strategic projects for social housing: we rethink the question within the rules of the game and provide a quality solution turning ‘social housing’ into an investment appreciating in time instead of a non-capitalizable expense. In this way the families using popular housing find they have capital which grows steadily as the value of the property appreciates.”



Aravena, A. Renca

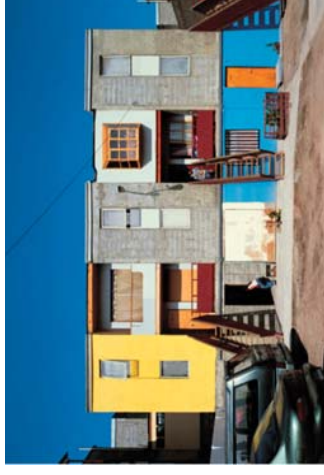
In this tidy development of row houses, 170 families who once lived illegally have become homeowners and some have started small businesses.

Working within the limited subsidy ceiling, the ELEMENTAL architects constructed much larger homes than would normally be possible with \$10,000, but left the interiors unfinished. The residents moved into houses with bare concrete floors and plasterboard walls; ELEMENTAL PROVIDES THE SKELETON, AND LEAVES THE REST TO RESIDENTS.

ELEMENTAL builds the townhouses three stories tall, but fills in only the second floor and the staircase to get there. Residents must complete their own homes’ third floors; the firm holds workshops on building structurally sound staircases, floors, and ceilings.



Initial dwelling



Extended construction



Initial Interior



Aravena, A. Quinta Monroy

CONCLUSION

The standard house is built as a highly static and immovable object, but the people who occupy them are not. Families grow, shrink and change and so do the occupants and their needs. The NextGen Housing Masters Studio should address the growing housing affordability crisis in Sydney through the agency of architecture and its capacity to transform.

The ultimate flexible interior may be one that is completely amorphous and transitional; changing shape, color, lighting level, acoustics and temperature as the inhabitant moves through it.

Flexible buildings are intended to respond to changing situations in their use, operation and location. This is architecture that adapts, rather than stagnates; transforms, rather than restricts; is motive, rather than static; interacts with its users, rather than inhibits (Kronenburg R., Pg 11). It is a design form that is cross-disciplinary and multi-functional; consequently it is frequently innovative and expressive of contemporary design issues.